

Notes of the DAISY Braille Music Round Table

Leipzig, 14 June 2018

A discussion and planning session on the future direction of standards and tools for the production and sharing of music braille files.

Chairs: Arne Kyrkjebo (NLB, Norway) and Sarah Morley Wilkins (UK)

Notes: Kari Rudjord and Sarah Morley Wilkins

# Participants

## In the Room

Arne Kyrkjebo (NLB, Norway)

Sarah Morley Wilkins (Project Consultant, UK)

Matthias Leopold (DZB, Germany)

Hannes Kaden (DZB, Germany)

Thomas Kahlisch (DZB, Germany)

Giulio Benincasa (Italian Library for the Blind, Italy)

Gianluca Casalino (Italian Library for the Blind, Italy)

Roger Firman (UK Association for Accessible Formats, & Golden Chord, UK)

George Kerscher (DAISY, USA)

Lynda Chung (The Hong Kong Society for the Blind, Hong Kong)

Geert Maessen (Dedicon, Netherlands)

Bert Frees (DAISY, Belgium)

Kevin Carey (World Braille Council, UK)

Brad Turner (Bookshare/Benetech USA)

Diane Bergeron (CNIB, Canada)

Lia Cariboni (SBS, Switzerland)

Francisco Javier Martínez Calvo (ONCE, Spain)

Jostein Austvik Jacobsen (NLB, Norway)

Kari Rudjord (NLB, Norway)

## Online via the YouTube Broadcast (confirmed)

Bill McCann (Dancing Dots, USA)

Leanne Strickland (Statewide VI Services, Australia)

Haipeng Hu (BrailleOrch, China)

James Bowden (RNIB, UK)

Sally Zimmermann (RNIB, UK)

Luc Maumet (WIPO/ABC, France)

Rebecca Blaevoet (CNIB/ICEB, Canada)

Erich Schmid (School for the Blind, Vienna, Austria)

Jordie Howell (Vision Australia, & Chair of ICEB Music Committee, Australia)

Dorothy Hamilton (Vision Australia, Australia)

Harry Cox (VI Specialist Teacher, UK)

Peter Bosher (Soundlinks, UK)

Scott Erichsen (The Piano Man, Australia)

Jane Wegener (Vision Australia, Australia)

Cheryl Roberts-Dupasquier (Manitoba Education and Training, Canada)

## Joining for the afternoon session

Dorine in 't Veld (Dedicon, Netherlands)

Avneesh Singh (DAISY, India)

## Apologies

Andrew Furlong (Vision Australia, Australia)

Antonio Quatraro (Italian Library for the Blind, Italy)

# YouTube Recordings

**Music Braille Round Table Meeting 14 June 2018 – sessions 1-4 -** <https://youtu.be/Al5ZPQJEfVg>

(the meeting notes contain approximate time-stamps for each session)

**DZB demo Capella with Hodder -** <https://youtu.be/JRmvPPRgGzI>

Matthias Leopold DBZ.

**Italian Library for the Blind presentation -** <https://youtu.be/VlXt5URpifo>Giulio Benincasa & Gianluca Casalino (Italian Library for the Blind)

Also, see their PowerPoint presentation attached to these notes.

# Executive Summary of the Meeting Notes

We had lively discussions both in the morning and afternoon sessions. Online YouTube viewers sent their questions by email which were addressed in each session, and are included in these notes. With 19 people in the room and 15 online, we had a good representation of agencies, technologists and end-users around the table, from Europe, Australia, Hong Kong, Canada, USA and China.

Sarah started the morning meeting with the background to the project, together with a 45-minute information session summarising the main issues arising from the research reports (previously circulated). Arne then led three discussion sessions on File Formats, Conversion Tools, and File Sharing (5 mins introduction 30 mins discussion, 10 mins for next steps). We had hoped to reach agreement on next steps at the end of each session, but the discussion was so lively that this was not possible in the time available. A recording of the meeting is available.

IBOS demo sticks were available of their software MusicXML Reader, and the afternoon sessions were recorded and included a demonstration from DZB of Capella with Hodder, and from the Italian Library for the Blind on what they hope to develop with BMML (Braille Music Markup Language) and their Braille Music Editor and Reader tools. Informal discussions were also held about mark-up languages MusicXML and BMML and related tools, about file sharing and metadata, and about teaching and learning of music braille.

File Format Standards: We discussed the the strengths and weaknesses of MusicXML and BMML to understand more about presentation and the semantics of the music are conveyed; and how they should be created in the source file. Further discussions are needed to establish what improvements are needed in one, or both of, these file formats and how to standardise them. A high quality source file is the best way to get a high quality braille file, and we need to get better source files from publishers and from scanned paper copies to achieve the possibility for greater automation. We also need error checker and validation tools to automate some error identification and fixing.

Conversion Tools: This discussion built on the previous one. Most tools use MusicXML rather than BMML; but MusicXML doesn’t always contain everything we need for braille, which BMML tries to include. Liaison with W3C is now vital. Country differences of code and layout dramatically restrict some automated conversion and file sharing, and harmonising these to some extent could be beneficial. The biggest improvement could be through pooling our resources on a large scale to get to a ‘disruptive solution’ which would benefit the entire sector, though some compromises may need to be made by individual countries for the greater good. It is likely that we should seek to make quick improvements to existing tools as well as seeking a longer-term strategy – which could involve focus on one specific tool as well as developing a centre of excellence to support smaller countries.

File Sharing: Various collections were discussed (including NLS, ABC, BookShare). Files suitable both for end-users and for agencies are needed, and sharing high quality source files such as MusicXML, BMML, Cappella, PDF, would be useful, with a metasearch across all catalogues (a store model), together with embosser-ready files. PEF, BRF and unicode braille files were discussed, though page size and layout rules mean further work would be needed to re-flow the content. The metadata we establish will be crucial for simple and effective international file sharing and retrieval and needs to be agreed. In future, BookShare might be able to offer conversions of music braille files online, as they do now for book files.

Next Steps: The meeting itself did not conclude firm next steps, other than to agree that we wanted to maintain our dialog and commitment to making improvements in the sector for shared benefit, and to talk to W3C. We agreed that we should take two kinds of action:

* activities which improve the situation with file formats and tools quite quickly – some of which we might all be able to do together with existing resources without seeking additional funding.
* start to prepare stages of work with costings for more major longer-term improvements – which are likely to require specific funding support.

Sarah and Arne will propose some next steps to share with the group along with these notes, which could form the agenda for the October London meeting.

Future meetings are likely to include:

* a DAISY music braille meeting on 31 October in London, after the DAISY Board Meeting
* a World Braille Council Summit on Music Braille in Paris 25-26 April 2019.

# Meeting Notes in Detail – Introduction (YouTube @00:00:00)

* Welcome
* Session is being broadcast and recorded
* Arne Kyrkjebø and Sarah Morley Wilkins
* Round the table
* Online: <https://www.youtube.com/user/NLBwebben/live>
* Questions/comments during the session to: Kari.rudjord@nlb.no
* IBOS demo sticks to take away; other demos/presentations after lunch will be recorded

## Why was this project started?

* To share expertise and resources in our niche sector
* To ensure that more paper-based braille music scores are available to more musicians in a timely and cost-effective way.

## Meeting goals

* Discuss key findings from the two recent DAISY surveys and agree next steps
* Offers of help for future work
* Corrections due by 16 July, then final report will be published and circulated
* Notes of this meeting can be shared
* Potential for a meeting around the DAISY meeting in London - tentatively 31 October 2018.
* World Braille Council Music Braille Summit in Paris, 25-26 April 2019.

## Timetable

08.30 Refreshments and introductions

09.00 Session 1: Summary of Main Research Findings

09.45 Session 2: File Format Standards

10.30 Break

11.00 Session 3: Conversion Tools

11.45 Session 4: File Sharing

12.30 Lunch provided for registered participants

13.30-17.00 Demonstrations and informal discussions/networking:

 - DZB will demonstrate Capella with Hodder

 - Italian Library for the Blind presentation

# Session 1: Summary of main research findings (YouTube @00:09:00)

Sarah presented some of the main research findings which were presented in detail in the Phase 2 Research Report previously circulated with the agenda. The text from her presentation slides follow.

## Respondents

Phase 1: Draft Research Outline

* 15 responses: agencies & developers
 - Europe, USA, Canada, Israel, Australia

Phase 2: Survey

* 22 responses: agencies, school, developers & end-users
	+ Australia, Canada, China, Europe, USA
	+ 16 agencies (12 replied to both Phase 1 and 2)
	+ 6 end-users (novice to expert)

## User-Request to Score-Received Flowchart

A reminder of the flowchart presented and described in the Research Report previously circulated which gives an overview of all the many issues involved in the music braille area.

## We need:

1. Input files to be as good as they can be at the start
2. Conversion and mark-up tools to be accurate & reliable, for agencies and end-users
3. Good access to existing intermediary files
4. Good teaching, learning and promotional materials

## 1. Input files need to be as good as they can be at the start

* Publisher standards – files, pricing
* High quality PDF or MusicXML files
* Music XML and/or Braille Music XML (BMML)
* OCR tool improvements
* High quality in = high quality out (usually)
* Proofreading – opportunities for efficiency
* Validation tools.

## 2. Conversion and mark-up tools need to be accurate & reliable, for agencies and end-users

* Suite of tools preferred, not necessarily a DAISY Pipeline tool
* Tools used: e.g. Capella-Hodder, GOODFEEL, Duxbury, BME, MuseScore, BrailleMuse, Finale, Sibelius
* Improvements needed including accessibility
* Country differences are a barrier for some end-users
* Conversion between layouts not likely to be effective
* Single high-quality source file needed to create different layouts (e.g. Capella, Lime, MusicXML, BMML)
* Update rule books, and document differences for tools
* Sustainable solutions needed (Open Source or not)
* New braille displays need specifications and requirements capture
* Tools for end-users need improvement: e.g. GOODFEEL, MuseScore, BME, Lime, LilyPond, Finale
* Better handling of mixed text-music scores.

## 3. We need good access to existing intermediary files

* Marrakesh Treaty: ratified in e.g. Canada, Australia, [correction: China has not yet ratified it], Europe, Israel. Into force in Europe in October 2018
* File sharing common; Treaty will widen
* Minimum standards for metadata needed (for new, and for modified works)
* Online collections (e.g. NLS, BookShare, ABC Global Book Service, MuseScore, brailleorch.org)
* Agency and/or end-user file downloads?
* Digitizing collections – needs to be efficient.

## 4. We need good teaching, learning and promotional resources

* Significant area for attention
* Lack of resources for young/integrated learners
* Lack of music braille transcribers and teachers
* Coordinate and promote available resources
* Intensive training, online, using technology
* Multi-modal tools for reading and writing music.
* Out of scope for this project

## Discussion (YouTube @00:28:35)

Roger: has some points to raise on the report and will email them for inclusion in revision/notes - his comments are included in these notes marked as [Roger in writing] or will be corrected in the report.

Matthias: Will be interested to see the new braille displays, not seen them yet.

Kevin: In addition to Orbit and Canute I’ve seen the new full page braille display Graffiti prototype 3, which is going into production next year, uses same low-cost braille technology as the Orbit. In answer to an online question from James: it is currently a graphical display but is designed to be used for text too, to emulate a braille display. Orbit 20 cell will retail at between $400-$500, and is coming out of the factory now.

Sarah: Specifications and user trials are underway for most of the displays now, in various countries.

Roger: I have an Orbit 20 with me if anyone wants to see it today.

Lia: For file sharing, cataloguing is a challenge, especially across different languages, codes, page sizes etc (the Contrapunctus project worked on this).

Sarah: Yes, we should agree some metadata specifications and run some trials sooner rather than later.

Mattias: When sharing files, it’s important to know whether it’s been proofread or not, and maybe we need checking tools to determine basic quality (failures).

Sarah: Yes, similar to validation tools – could work together to ensure appropriate quality files so user knows what they’re getting.

Gianluca: For file sharing, we propose adopting BMML as the standard.

Sarah: Next session is on file formats, but from research people don’t understand yet the difference between MusicXML and BMML; we need to explore the strengths and gaps, and harmonise our specification so the tools can be more accurate, efficient and get better files out.

[Roger in writing: We would have welcomed more attribution to respondents in respect of evidence provided.]
Answer: Attributing evidence to individual respondents throughout the report would have been inappropriate, as some may not have wished their views to be that identifiable. Where it was relevant that a respondent was identified they were; and where it was less important they were not. If anyone has specific places where you think attribution would be particularly valuable please state them by the correction deadline of 16 July, and we will look at each case individually.

[Roger in writing: We know there have been 22 responses, some combined, some are not, are we sure this is wide enough base from which to work? As we get further down the line, others not so far involved could query why it is only now that their input is being sought.]
Answer: This started as a small DAISY board member initiative, which quickly gained interest from wider parties. Whilst not everyone in the sector has responded, or perhaps not even been reached yet, we belive that the number of agencies responding in this level of detail to two surveys gives us a good indicator of the state of the field, and should allow us to plan some action together. We will continue to invite relevant agencies, and keep the dialog and circulation list open with as many as wish to take part.

# Introduction to Sessions 2, 3 and 4 (YouTube @00:38:13)

Arne introduced the next sessions as being highly connected to each other – file formats, conversion tools and file sharing. He thanked Sarah for the high standard of work she’s undertaken, and was pleased to see so much input and engagement from the sector. He has high hopes for this process and what we can achieve together.

Arne described more about the basis of this project: at NLB they have established a very efficient, highly automated literary braille production. For music braille, they tend to outsource production to Denmark. For the low numbers of Norwegian students or professionals (e.g. organists, priests) music braille is vital for them. One person in Norway knows about music braille but will retire soon. Before producing external production services, NLB wanted to know whether they should procure services, or were there better ways for them to do it? What tools exist, what processes, what country differences? They are open to anything, they just want better services, more and better music for their users.

We really hope to agree some next steps and for people to contribute to the next steps.

He went on to describe how we have come to think about the central part of the whole process flow of producing music braille, which he illustrated and described with a flowchart:



Description: The flow starts with the Sources (e.g. BMML, Music XML, Paper, PDF, Braille Paper or BRF); then moves into Pre-Process (e.g. Scan, OCR, Conversion, BMML to MusicXML and vice-versa, and other conversions); then Manual Editing. Then into Production (where the conversion and the formatting takes place, which could be different tools). This can create the output, or can be input to a braille tool, then output. The output goes into a local collection, and maybe also a global collection. And the flow then starts again with the Sources – as the source from the production could be a file from the global collection, used as the input.

# Session 2: File Format Standards (YouTube @00:52:40)

## Suggested discussion points

* OCR development
* MusicXML – BMML: strengths and limitations
* Others
* Validation tool

## Discussion

Roger: for any non-proprietary software (publically available software) we need access to the schema for that software (how things are specified) and which licence is applicable to the software tools which may be considered. We need all the relevant information.

Arne: If it’s a black box we need to know what’s happening inside.

Jostein: these schemas are already defined for MusicXML and BMML.

Gianluca: we can share the BMML schema, the DTD.

Mattias: When using MusicXML you won’t know if it’s got certain things inside, there will always be some kind of loss. Same with BMML. There is not a perfect format for presenting music braille, there is always something to correct. Also, we will always need scanning tools, because it is impossible to make everything automatically. Also, where no digital version exists (e.g. an old score), we will always need to create one by scanning.

Thomas: Maybe we should run an Inclusive Music Project, to get funding to work with publishers at getting more structure into the source files.

Mattias: there’s a source file missing from Arne’s flowchart – the ‘Score Format - popular with many publishers e.g. Carus; It’s very complex, no logical structure. Lots of scores available in this format. But could be good to run a project to write a converter for this file format.

Arne: research gave general impression that publishers were a bit negative, and files not good enough for us. They said it was often easier not to use the files than to use them.

Mattias: Also, MusicXML files from publishers - some files received are very good quality, very logical, good structure. Others are quick and dirty and unstructured. Also, if the publisher/setter has left a digital footprint in the code it could affect the braille – so we need to know it’s there so we can extract it.

George: DAISY hasn’t yet done anything with getting music files from publishers as part of their Inclusive Publishing Project, and asked questions about whether publishers allowed their print scores to be viewed online by sighted people (answer from Sarah: no – either sent to trysted intermediaries, or to the blind person, they want to retain the rights); how they were viewed on-screen (answer: a PDF viewer as they’re graphic files); about how publishers create the musical scores (answer: e.g. Capella, Sibelius and Finale, which all output some kinds of XML; But MusicXML is never enough for us); what file formats etc, and these issues were covered throughout the rest of the meeting.

Mattias: publishers typically only offer PDF, and try to deny access to the digital music inside the PDF as much as possible.

Thomas: MusicXML output of these publishing software contain a lot of visual information, which is not easily converted into braille.

Jostein: asked if anyone has ever tried combining MusicXML with ePub?

George: since ePub is just HTML, if MusicXML can be converted to something for display in a web browser, then this could be a good way to standardize it as a file format.

Francisco: the problem is that the original music score is graphical – it can be converted but it’s not ideal.

Kevin: whatever the creation program is, it involves elements being positioned in a 2 dimensional framework - which is not likely to be automatically converted into a linear code. The problem is, until we get together to write a user requirement, we might all spend small amounts of money to do parallel initiatives.

Sally (online): MIT are doing the most work on converting MusicXML into other things; and Sarah highlighted the Report where they are looking for developers to be in touch.

Sarah: reminded us to look at Haipeng Hu’s detailed specification and requirements document for a music braille software – links are in the Report; he’s looking for developers and funding to bring it to life. Also, existing lists of improvements could be made with enough resources put behind it.

Mattias: said he has never seen a MusicXML conversion after 15 years which is totally accurate. Maybe has too many open dimensions – doesn’t expect any software tool can convert with no mistakes.

Brad: asked that since Finale and Sibelius use MusicXML whether we should focus on fixing that format as it’s being used in the mainstream already.

Mattias: yes, it’s the standard in use, but it doesn’t work perfectly, even after 15 years, there will always be mistakes.

Kevin: we should consider taking a global initiative to fix MusicXML to make it more robust and get it into a standard we can use.

George: described how a similar code works - MathML – which is also a graphical representation - it has a presentation layer and a richer semantic layer. The presentation layer, allows e-g- a squared symbol to be displayed. The semantics underneath the symbol may mean something different despite the same presentation, and give more information. They both need to live at the same time in the same file. Same issue with LaTeX (?) - need more than just the presentation, also need the semantics. Without the semantics you get the conversion errors - probably the same for MusicXML now; needs to add more semantics to do what we need.

Gianluca: MusicXML is a good standard – but the problem is the way that the mainstream publishing tools (e.g. Sibelius, Finale, Capella) export – it’s good for print representation, but not for braille needs as it doesn’t contain enough of the semantics. If you include good semantics then it’s effective – and that’s what BMML does. This is the format which Braille Music Editor and Braille Music Reader use.

Sally (online): musicxml is only a mark up language as good as the source material. MuseScore is Open Source (rather than Finale, Sibelius etc) and open to revisions on errors anyone finds and reports.

James (online): in my limited experience, all commercial music editors can export to MusicXML, even if they have another proprietary format. I have experienced very good results converting from Music XML. Even though there are visual elements, the conversion programs I have used have coped well with these. A successor to Music XML is also being developed, which I understand aims to try and separate out the visual presentation from semantic musical information, rather as CSS does with HTML. The main problem is how the file is put together, just as you can create accessible or inaccessible Word documents, the same is true with XML.

Arne: To try to sum up, we didn’t talk very much about the differences between MusicXML and BMML, but we will continue during the day. Music XML is more universal and used by more tools, and BMML is specific for music braille, but fewer tools use it. Need to explore more about what they’re both for, and how we can develop them. We do need to coordinate our efforts better so our requirements are clearly documented and shared with developers.

Kevin: asked for some time to describe an approach for global developments with unified requirements – yes, after the break. We are a fragile industry - many experts in this room; a bus could off a cliff.

Mattias: can’t separate BMML from their tools Braille Music Editor and Reader; he doesn’t always like MusicXML but it is the standard.

[Roger in writing: Ideally, if we get to the stage where the norm is publisher files in, high quality braille out, then fine. However, let's not forget that flexibility will be required with the end-resulting files. We are obviously not there, as much work is done from paper print copies.]

James (online): I concur that the typo in the report DX is almost certainly meant to be DXB.

Technical reference links:

* MusicXML with links to the DTD and XSD schemas: <https://www.musicxml.com/for-developers/>
* Description of the BMML format (PDF): <https://www.irit.fr/publis/SIG/2008_ICOMP_EJMR.pdf>
* Full details of BMML and BME Tools available as final documents from the Contrapunctus Project in a zip file from Antonio Quatraro of the Italian Library for the Blind, email: a.quatraro@alice.it
* W3C Music Notation Group: <https://www.w3.org/community/music-notation/>

# Session 3: Conversion Tools (YouTube @1:31:45)

## Suggested discussion points

* Could we ever achieve 100% automated accuracy?
* Where should we put our effort for improvements?

## Discussion

Sarah: Happy Birthday to Arne!

Jostein: gave a short summary of the difference between MusicXML and Braille Music XML (BMML): BMML contains layout information for braille music, whereas MusicXML contains layout information for printed music.

George: who is maintaining and developing these standards? Answers: MusicXML is W3C (DAISY is a member of W3C); BMML is not yet an official standard – it is being proposed as a standard by Italian Library for the Blind. George recommended that we get our experts onto the relevant working group to get our requirements in.

Fransisco: is there a difference betwen MusicXML and MusicML? Answer: MusicXML is the standard being maintained by W3C. MusicML is dead!

Kevin: I’d like to explain a development model which could work for us, using his Orbit project as an example: I promised in Leipzig 2011 to cut the cost of refreshable braille by 90%. Ran a worldwide user requirement consultation, and worked with major blindness agencies to narrow and agree. I then set up at Limited Liability Company in Massachussettes, and people bought shares to have an opinion. They had 10 shareholders, put in total of $1.5m. They compared user requirements with 66 braille display projects, ranked them, selected three. Got lawyers to help secure the company who could produce the user requirement, technical specification for the specified cost. Kevin believes that everyone trying to reach perfection (being particularist), rather than agreeing compromises to get improvements, doesn’t work to make big changes in the sector. The World Braille Council is hosting a music braille summit in Paris in April 2019 where he hopes we can all agree user requirements, and invest to get technology developed. Wants us to be more disciplined in what we want, collaborative in getting what we want within our fragile environment. Wants us to do something to protect the future for braille, agree our strategy and get it financed.

Bill (online): I agree with Kevin about the importance of pooling resources, and I agree with Mattias about MusicXML being the standard we should focus on as far as possible, building on the existing standard to improve it. Hopes to be there in Paris in person.

Sally (online): MusicXML and its replacement under construction, MNX, are part of the W3C Music Notation working group remit. She represents the UK Association for Accessible Formats (UKAAF) there with Daniel Spreadbury (from Steinberg). And the Music Subject Area of UKAAF has three reps there.

George: joining W3C music group is free, any of us can join – their last meeting was held in April, and the 2 hour video is online to view, talking about MNX. See their webpage: <https://www.w3.org/community/music-notation/>

and the video is at <https://www.youtube.com/watch?v=GToEhCIBqhA>

Arne: shared the suggested discussion points to focus our discussion again.

Mattias: regarding the discussion item ‘can we ever get to 100% automation?’ - whilst some tools are approaching accurate, we may never get 100% - especially if the source contains mistakes we can’t correct them automatically. Using Capella Scan, proofreading at DZB shows that 95% of mistakes are because of the source, not because of the conversion. High quality files give better results with Capella Scan.

Lia: confirms what Mattias says - we have the same experience at SBS – there are so many variables in the quality of the score from the publisher where things may not be standard, it might be impossible to ever achieve 100% automation.

Kevin: we should prioritise the problems we have – we can reduce errors if we don’t scan; and we can check the scan for errors. Importantly, correcting errors in print originals should not be part of our job/requirement for a tool; that’s not the transcriber’s job.

Gianluca: Maybe artificial intelligence will help with that. The difficulty with music braille is that you can write the same things in two, three or four ways, and how you make the layout of the score is also important. It’s definitely better to have an 80% correct score than no score.

Mattias: I agree with Kevin that it’s not out job to correct faults in the original score. Sighted proofreaders can easily spot where things are in the wrong place in the MusicXML file (e.g. where a crescendo mark starts) it might be perfect in print, but needs to be corrected for the braille version. He said that these are the biggest kinds of problems from MusicXML files. For accuracy, two proofreaders approve the braille version they create at DZB.

James (online) said he understood that print can also be very imprecise about a crescendo mark anyway.

Brad: BookShare haven’t been able to host and share music braille files yet (under publishers copyright permissions) but will be able to after the Marrakesh Treaty is in force. They already have plans to host the RNIB and CNIB collections of music braille.

Diane: CNIB is reviewing its music braille programme, looking to potentially work with other organisations to contribute to a solution, and how to manage a centre of excellence for the production of braille, which we could contirbute to - as we have no internal music braille expertise and want to liaise with other experts.

Arne: asked whether it’s most important for us to have the tools so anyone can produce, e.g. can anyone use the DZB tools; and/or should we have a centralised centre of excellence where skills and knowledge can be maintained (e.g Norway outsources production to Denmark).

Mattias: anyone can use the DZB tools to create music braille, but if you don’t know music braille you won’t be able to spot errors or correct it (e.g. at DZB everyone has to know music braille). You put MusicXML in, and get music braille out. Always improving the tools, but if the source isn’t perfect, the output won’t be.

Arne: it’s hard to keep those kinds of skills in small countries e.g. the Nordic countries (meetings held between Norway, Sweden, Iceland, Switzerland, Netherlands), so perhaps a shared skilled service would be most cost-effective.

Kevin: if we have more effective automation as well as the capability to outsource music braille production countries would have a solution to suit them. We don’t all have to be doing it ourselves.

Arne: Yes, in Norway we buy our music braille services from Denmark.

Mattias: there will always be users, as well as producers, who have questions about music braille, who will need an expert to contact.

George: we need to get into the MusicXML working group to improve MusicXML by adding the attributes we need so it gives us what we need for the braille conversion. Then we could get more accurate automated transformation into braille, and/or BMML. When we share files, presumably we’ll need high quality master scores of different kinds – e.g. 1) the original score/scan as e.g. TIFF/PFD, 2) MusicXML and 3) BMML. We can always go back to the source file to make corrections. That way we can have an international standard that can be unified globally, and reduce the amount of human intervention needed.

Brad: if MusicXML is the file transfer/storage format (the master file) and there’s a conversion engine to get it into BMML, the tool will need the country specific layouts in those transformation tools won’t they.

George: we could simply have a language tag on the XML. But could we try to harmonise country difference to minimise the differences in global files?

Gianluca: the software must represent the BMML, but the HTML file needs style sheets to display it. The BMML describes how to display the contents, so country layouts should not be included in the BMML but as a style sheet.

Lia: also advised not to mix the description of the music with the things you want in braille – some things have to be in the BMML; other things have to be in the MusicXML but that has to be right.

Kevin: if we use the strategy of user requirements to define what we want to do, and if we believe that different layouts work against automation – could we accept compromises in the interests of securing the future, especially where country layouts often arose from custom rather than conscious agreements. Could we try to agree acceptable, rational layout standard in order to improve automation?

George: read from the W3C website: the music working group has to maintain MusicXML 3.1, and the Standard Music Font Layout standard (SMuFL). You use that to get the presentation right. The same principal would apply to music braille. We need to put forward same use case and requirements for braille/font layout. This would fit right in with existing standards.

Jane (online): has anyone had any success with playing music onto the computer using Sibelius, adding the dynamics manually and using that file for quick translation? Playing in the notes could be more accurate than direct brailling and much quicker to play and edit. Our team is considering trying this.

Lia: yes, we have tried this - playing the score into Finale, but was problemmatic - they had to be very precise – and for complex scores it was very, very difficult. Stopped after a few trials.

James (online): putting language markers in the XML file is not a good idea: When we start talking about sharing files, we want the same score in different layouts. That would mean you'd have to dig into the XML to change all language tags for the local language requirement. The only language tags should be for literary text, e.g. lyrics, titles etc. Also, I'm not sure why you'd need to convert XML to BMML and keep both: go straight from XML to the final braille file. e.g. Music XML to BRF, PEF etc. Also don't forget, Music XML can be used to create all kinds of end-user formats, including audio, large print (Modified Stave Notation), as well as braille. BMML may be an end-user format for those who wish to use BME as their platform of choice. As with most things, keyboard use is more precise than mouse use. George agreed with James’ comments – and asked if James is on the W3C group – Roger said not yet. The transformation between MusicXML and BMML could be done in a similar way that MathML and CSS is done; and MusicXML and SMuFL.

Gianluca: as a blind musician with only one file (BMML) I can provide a professional and easy to use score. I can read and print, for braille display, braille or print. Without any correction or re-editing. Good for costs. Just change the layout files, the CSS.

Mattias: with so many braille musicians in the world using different layouts, having to learn by heart, changing their layout would make it very difficult for them to learn (e.g. bar by bar, or section by section). Also, I believe that it is not possible to convert between the different layouts without reducing the integrity of the musical layout. MusicXML as the source is best – to create those different layouts.

Kevin: We need a rational decision about different layouts - we need to take a reality check – it would be nice if we could retain all those different layouts, but we may reach a situation in some countries very soon that it is either a layout that you’re not used to, or nothing. He felt that we can't afford different standards, or music braille may die.

Roger: the technicalities of braille music system could be mapped for the different layouts. Many users have already used different layouts for a long time out of necessity.

James (online): regarding layout: any musician beyond a certain standard will necessarily come across music of different layouts - but the actual braille music symbols are the same - or almost the same. Slightly extreme example: this is true in print as well if you think about it: for example, some scores have all the notes written out, others use figured bass. A sighted musician has to learn the different formats - the braille musician also has to learn the different formats. I remember borrowing a piece from a library and I had to be a linguist as well as a musician to read it! We've talked about file format to use, can we talk about the quality of the tools? As came out from the survey, all the tools are good, but can all do with improvement. How can we progress development to make the tools better? The primary problem is simple bugs, e.g. symbols not being supported, poor layout, lack of configurability for particular options etc.

Arne: summarised the discussion: the tool discussion became a discussion on formats; we have to have some agreed standard and sepcifications to give to developers of conversion tools.

Sarah: we need to speak to W3C fairly soon now we are a bit more prepared. Regarding requirements gathering a question for Kevin – is it worth generating a complete set of new requirements; or try to identify improvements for existing tools which with some effort could be our solution.

Kevin: Our strategy with refreshable braille – if you want a disruptive change – you need to put your resources behind one tool. Small fragments of development in a number of tools won’t get the big change, only incremental development. We should focus on one solution to get the biggest change – and do it quickly before sector expertise goes. We need a disruptive solution soon which can be universally recognisable, and used globally.

James (online): I understand print is very imprecise about crescendo, even if you have a paper copy…

Rebecca (online): why does Kevin think countries are soon going to have to face facts about formats disappearing. Since we don't have a standard yet, for file-sharing, what makes him think that?

Kevin: By talking to agencies and comparing the expertise they are losing through retirement with their recruitment – a large net loss.

[Roger in writing:

* regarding more automated mark-up: if accessibility and usability can be built in then that is desirable.
* regarding using off-shore companies to mark-up files: I can see why this could seem an attractive route, if a library/organisation has no music expertise and wants to rely upon software after mark-up to do everything with no intervention and trusting it is good quality.
* I think we need to be careful here about defining the software. There is stave music notation software, braille software for text translation and braille music software. All are very different serving a variety of purposes.
* re layout/formatting differences: there is a fundamental misunderstanding about the ICEB resolution here. It is not seeking to update NIM alone, far from it, this has to be an international project, and that is what is being worked on.
* Conversions using different braille character-sets does need to be resolved.
* re open source vs proprietary software: This is, I suggest, not an either or situation.
* re output suitable for refreshable braille displays: We need to do further experiments with, essentially, the three variants of braille displays, those with very short lines, those with longer lines equivalent to around 40 cells, and devices which use multiple lines.]

# Session 4: File Sharing (YouTube @ 2:31:25)

## Suggested Discussion points

* File formats
* Country differences
* Metadata
* Audience
* Legal issues

Roger: If we’re going to share BRF files, then we need to find a way of converting between different character sets.

Mattias: We should share PEF files (developed by The Swedish Library?) which allow you to encode any file and print it with any printer in the world – and suggested that this should be the only file used (it’s like PDF but for embossed files).

Arne: file sharing requirements might be different for end users and for libraries – e.g. some may want to simply read the file; others to use as a production file.

Brad: could there be a master global file store to get the MusicXML file, can do a little local conversion for their local needs which removes the most amount of work and can be automated to get a high quality output?

Gianluca: Best way to share is in two ways: 1) share BMML file, or whatever markup language we choose. 2) Share the text file, proposes unicode braille - just uses one representation, so it’s the same for everyone. But not all manufacturers of braille printers have yet made it possible to use.

James (online): Another problem is different countries use different paper sizes. This really requires a reconvert, because layout will change.

Sarah: shared more details from the Phase 2 Research Report section on file sharing, outlining the key issues raised by respondents. File formats being shared, BRF, BRL, DX(DXB?). Some agencies don’t know about these developing collections. RNIB hosts theirs on MuseScore and at exam boards websites. Getting files directly to end-users is as important as getting files to libraries. They could get the files themselves. Everyone willing to share files. The only limitation could be if the agency has any limitations on sharing files with particular disability group, or particular countries, or a funder placed restrictions on the file created. Will it be a metasearch across all collections or a store of the files? ONCE and SBS have ingested each other’s files into their own catalogues. Metadata suggestions were very different, some commonalities; some will be essential for quick and accurate location of files. Need to agree the metadata and trial it. End-users using NLS and RNIB, Golden Chord, BrailleMuse, DZB, and mainstream public domain collections for print music. Metadata should include who created the file, so you can determine if the file is appropriate for the user need. Users want more files generally. Advice received from several agencies around digitising collections: get a good quality file to start with; use GoodFeel; keep the source; outsource it!; use an up-to-date score; prioritise them for things most in demand; maximise error prevention and checking; make enough time for error checking and editing. Almost all new materials will be digital, but making it efficient is key for everyone.

Brad: for Bookshare – for books – volunteer scans a file, gives an RTF, then it is sent out for checking to get a good quality file. Or the publisher sends a file (nearly perfect; we don’t fix errors we find). With either one of those file types EPUB2 or EPUB3 or RTF, they convert into multiple formats, DAISY, Audio, BRF, ePUB3 and MSWord. In some of those formats you can have different options, e.g. in BRF choose page width. For music, if we had a central storage for braille music files could we convert them into a few key filetypes, e.g. Capella, so libraries/users can grab what they want and edit as they need. So we centralise the storage of the masters. So conversion could happen in one place, rather than in lots of different conversion engines around the world. Is that the most efficient way to do it?

Kevin: we don’t want to get sucked into lengthy discussions about metadata for library records, need to view our collections as a shop store, not a library. So we can find a score wherever it’s been produced through a meta search. E.g. on Amazon you can find the same book in different formats, or from different agencies; rather than having restricted access to different library catalogues.

George: are there national archives digitising music files which we can build on for braille music, can we tap into them? E.g. those archives digitising ’everything’.

George: Brad, can we do music in the USA under Chafee?, or Marrakesh? Answer: not under Chafee, (we can’t produce music braille; but we can hold and distribute it now as we do for RNIB and CNIB; but once Marrakesh is ratified they can also produce, so in October, we can start to share Music Files in BookShare. A global library approach linked together could work to allow a federated search. Yes.

Luc (online): The ABC Global Book Service already allows participating libraires (35 today) to share music scores. Nearly 5,000 music scores are already in the ABC catalog.

Roger: Two points. Firstly, regarding correcting source files – e.g. a file had the incorrect clef sign which had to be corrected before converting it into braille or it would have been a disastrous result. Secondly, in the absence of a perfect score in my preferred layout something is better than nothing.

Mattias: It does matter that kind of publisher music is from, and this should be part of the metadata, especially important if you’re studying something, and some are more academic, have notes etc – so disagrees with Kevin who said it wasn’t necessary.

Rebecca (online): Have we solved the problem of maintaining consistent repositories across

nations? Could it be the responsibility of the braille standards authority in each country/region to keep a repository of the electronic files, available as Zip files? The task of making sure the organisations have the updates would be the responsibility of whoever has that role in whatever international braille committee would take that on. In other words, say ICEB incorporated the role of music braille files archivist into its remit, the particular person on ICEB would be responsible for sending out updates notices to national organisations and their people would upload the new music scores to thier national web or electronic storage.

Sally (online): As an end user of stave notation I search on google for "Beethoven Symphony No 5 free sheet music". That will work similarly for "Beethoven Symphony No5 braille music".

James (online): Music XML is your central format and can make all sorts of formats and you can make parameters for your braille translator. See BrailleMuse, GoodFeel etc.

Sally (online): As I understand it, with my RNIB hat on, Benetech for Bookshare are negotiating with one of the major music notation so music files could be uploaded. Meanwhile, if you google a music score title and add ‘braille music’ you will get some results.

Rebecca (in writing): re Roger’s comment about accepting something rather than nothing - this kind of attitude is really troubling. Print readers do not tolerate sub-standard quality, they demand good quality. This refers back to Kevin's point, store vs library. As braille readers we should not settle  for poor quality in 2018.

[Roger in writing:

* Re ‘musicians need to be able to compose, edit and share their own music’: There is a fundamental problem here. It is not directly related to braille music, rather it is a screenreader and accessibility to stave music notation packages.
* We know that differences with files using different character sets is an issue.
* If agreement can be reached (with metadata), then that is the ideal. At the very least we should be striving for a minimum standard which links the print source used with the braille output which could include details about language, format, page dimensions and line-length.]
* Perhaps we should try and gather information concerning the libraries/organisations who have files which can be downloaded.
* Denmark and South Korea have digital collections, there are possibly others too.
* Each agency will make their decision whether it is purely customer-led or not. A single worldwide repository would be wonderful for all braille music files, given one could find what you are looking for.
* Without new musicians learning braille music, we should reflect whether what we have so far discussed is worth pursuing!
* Multi-media resources need very careful consideration. They can be a way of bypassing braille music with the learner playing by ear.]

Arne: More work to do together, has secured Sarah till October, and hopes to extend further. Hopes to receive offers of help to keep the work moving. There’s a DAISY meeting end of October, could meet then too. Also Music Braille Summit Paris, April 2019.

# Afternoon Sessions

* **Music Braille Round Table Meeting 14 June 2018 – sessions 1-4 -** <https://youtu.be/Al5ZPQJEfVg>
* **DZB demonstrated Capella with Hodder -** <https://youtu.be/JRmvPPRgGzI>

Matthias Leopold DBZ. Music Braille Round Table Meeting 14 June 2018.

* **Italian Library for the Blind presentation -** <https://youtu.be/VlXt5URpifo>
* Also, see the Powerpoint presentation file attached to these notes.
* Also, a demo of BMML is being prepared by Gianluca and can be shared when available.
* **Informal small group discussion about file sharing and metadata**
including how metadata should handle pieces where the title is translated, e.g. Magic Flute / Die Zauberflöte? The Contrapunctus project developed questions around metadata for music braille, and that expertise will be valuable.
* **Informal small group discussion about teaching and learning of music braille**
including who and how could collect information about existing resources world-wide and identify gaps, and develop missing resources? This is outside the scope of the current project.
* **Informal small group technical discussion re MusicXML and BMML**
the following email trail from after the meeting is included here with permission of George and James, about music file formats in general:

-----Original Message-----
From: George Kerscher

Sent: 16 June 2018 00:51
To: Leopold, Matthias; Sarah Morley Wilkins; James Bowden; Roger Firman; Gianluca Casalino; Arne Kyrkjebø; Brad Turner; Avneesh Singh
Cc: Janina Sajka
Subject: Some afterthoughts from the braille music meetings

Hi friends,

I don't think I have everybody copied who should see this, perhaps it just gets put in to the notes. It is just my thoughts and I am in no way knowledgeable in braille or music.  So, take it as friendly input.

I copied Janina, who chairs the APA in the WAI in the W3C, if you understand all those acronams, Yiish!

To support more embossed braille music globally it seems that there are a few items:

- An archive of high resolution of scans of sheet music
- The Music XML 3.1 of those scores that have been OCRed. You probably want to mark if the files have been proofed or not
- Collections of probably embosser ready PEF files targeted at different size paper. I believe that PEF will print on any embosser, and if not, get the manufacturer to support PEF or you will discourage the purchase of those embossers.

- You may also want to have a BRF file available, but I think this would be for reading on a refreshable braille display.
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Brad, from Benetech, sounded like after October when USA ratifies Marrakesh that there are no more barriers to global distribution, and even before that there are work arounds to get the infrastructure set up now.
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Some technical developments:

Integration of a few people in to the W3C Music Community Group. This is free to join.
Put in to their document stack some use cases for braille music
See if there are specific requirements that are needed in the XML that are specific for music braille. They should be receptive to adding attributes that are needed or even elements if you put forward a good argument in support of that.

You may also want to think about a standard style sheet, but not sure about that.

EPUB 3 supports pre-formatted braille, so perhaps experiment with putting some scores in an EPUB 3 to see how that works. I could envision a collection of scores distributed in a single EPUB that would work with refreshable braille. To get started, all you need to do is put it into HTML; if it looks good in a browser, you could take the next step and put it into EPUB 3.
---
Regarding Braille Music Editor, Braille Reader, and BMML

It sounds like this is wonderful software that should be developed and maintained. I do not see a super large user base, but I do see a very important user base. The standardization of BMML, when it is only used by these two pieces of software maintained and developed by the same group does not look like it is necessary, IMO.

You may find that once DAISY has moved forward with our synchronized media work in the W3C Community group, that it could be used for your purposes, e.g. Music XML+your style sheet, plus MIDI, + normal visual presentation. I could see a very, very large user community to maintain the mainstream components and then all we would need to work on is the braille specific stuff. In other words piggy back on the mainstream efforts. This could possibly greatly reduce the work effort to maintain BME.

Hope this helps, and I could be all wrong, grin.
George

From: James Bowden

To: George Kerscher

Hi George,

Many thanks for your email.

May I pick up on PEF versus BRF a little:
Largely speaking, currently these two formats are identical and contain the same information.BRF uses the local ASCII encoding of braille pages; PEF uses Unicode braille encoding of pages and wraps the data in a layer of XML.

The only additional information currently supplied as part of the PEF format is the page dimensions. Page dimensions are otherwise advertised externally to a BRF file, but can easily be determined.

It is possible easily to convert between the two formats, except I do not know of software that does this - perhaps I should brush off my C compiler again...

So, in both the cases of BRF or PEF files, software is required on the computer to send the document to the embosser.

Most often, the software for sending to an embosser is normally a braille translation package, such as Braille Maker, Duxbury, or other equivalent software. Load the braille file, do not translate or process further,  and use the Emboss routine.

To my knowledge, neither Duxbury nor brailleMaker support PEF, but only use BRF.
This is something I think I have raised with Duxbury.

Braille displays, likewise, currently only handle BRF - it is a simple format and just contains the data a user actually wants to read. To my knowledge, I have not yet found a braille display on the market that supports PEF (please correct me if any of this is wrong).

Note also that PEF files are going to be at least double the size of a BRF file, because of the two-byte encoding of Unicode characters and one-byte encoding of ASCII, plus the extra XML tags in PEF, which are not present in BRF.
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You may be interested to note that the International Council on English Braille (ICEB) has recently written to DAISY about PEF format and the possible need to upgrade this format to contain more information. For example, it would be an interesting option to have navigation information included in the PEF file (or equivalent) so that braille display users can jump directly to the next heading, subheading, table etc, similar to the way many screen readers provide high-level navigation support in web browsers. I believe ICEB suggested in the letter that one of the reasons why manufacturers have not greatly taken up the PEF format so far, is because of the lack of benefit of the format. BRF currently offers them everything they need to do, PEF currently does not really add to this.

So ICEB has written to DAISY asking for a way to create navigable braille files and PEF 2.0 might be a way to do this ... as might EPUB 3+braille, HTML etc.

I trust this helps.

With best regards,
James.

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From: George Kerscher
To: James Bowden

Hi James,

Thanks for your thoughtful reply.

My understanding is that PEF was created to solve the problems of configuration on the braille embossers. The technicians were having a heck of a time with the BRF, because each embosser was different. This was the same problem with word processing files creating different outputs on different printers, and the result was PDF, and PEF was created in the image and likeness of PDF. I have been told that the embosser manufacturers are supporting PEF.

I don't know, but  would you still need Dux or some other braille word processer to emboss braille if you have PEF and a supporting embosser? If you still have the configuration problem, perhaps we need a simple mechanism to send a PEF to the embosser.

I am not concerned about the size of the files in this day and age, but I do understand that developing countries are key targets. Still, the files are small in comparison to almost anything.

We have tested EPUB 3 with pre-formatted braille. I would be very much against putting tags in PEF, because this would be creating the same nightmare we have with PDF. We should learn from mistakes. Happy to push EPUB and HTML with pre-formatted braille.

So, if there are standards that need development, or software to support braille, let's get it in a road map.

Best

George

From: James Bowden

To: George Kerscher

Hi George,
Good to hear from you again.

We may actually be saying the same thing ... but I understood the reason PEF was created was really to get around the internationalisation problem of different countries using a different set of ASCII characters to represent the braille dots. I liken this very much to the "code page" problem you had back in the day, in print. If I shared a file with you and I used, say, CP850 and you were set up for CP437, then all the special characters would be wrong.

The equivalent for braille was that the alphabet was the same, but other braille dot combinations were represented by different ASCII characters, depending on the originating country's computer code in use.

For example, the USA computer code has the dot 25 assigned to the digit 3 (ASCII 0x33) whereas in Europe dots 25 is assigned to the colon symbol, ASCII 0x3a. ... or putting it another way, an embosser set to the USA encoding interprets the ASCII 0x33 sign as producing dots 25; an embosser set to, say, German Eurobraille, would interpret ASCII 0x33 as meaning dots 146.

To solve this difference, a simple solution exists - though it has not been exploited: it is a trivial coding task to convert between the different braille embosser codes, a simple look-up in a table of 64 characters. I wrote such a tiny program about 26 years ago when I was a student... it would need some more work to make it a releasable product with a GUI etc, and all the tables needed for real-world use.

In fact, Unicode characters would solve this problem, and so PEF adopted this.

PEF then slapped an XML wrapper around everything for good measure.
Pick this apart a little and look at what is currently included in the XML: <line> and <page. are the primary tags and really these correspond directly to the CR+LF and FF characters which are actually sent to the embosser.

The only other data is in the header of a PEF file which just declares the page size.

So, currently, the XML layer of PEF does not contain much  additional information to the content of the document. If I recall, the PEF website does mention that it could easily be extended.

To send anything to an embosser, you need some kind of software - gone are the days where you could say:

c:\> copy file.brf lpt1

It is common I believe always to use software such as braille translation software in order to effect this transfer.

I did try sending a file direct to my own embosser - which claims it can support this and that and whatever else - the result was rather disappointingly, a beep. No braille.

So I intend to finish off a program to send a file to an embosser ... needed for other purposes, but it could easily transfer a PEF file ... I imagine the result will may well be brailling it as if it were BRF!
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I do see the attraction of having HTML or EPUB being used as a basis for the extra navigation being requested, but this, too, brings its own complications and potential problems.

The primary objection is code complexity: HTML and EPUB have a far richer XML vocabulary than is needed for the display of braille. This inevitably would lead to more renderer complexity on the side of the braille reader. There are many HTML tags which simply would not be relevant to braille. With especially the new range of cheaper braille displays on the horizon, such as, say, the Orbit Reader 20, with limited memory and space for programs, keeping things simple is one of the design goals.

On the other hand, HTML and EPUB offer the possibility of reflowable text, which BRF and PEF do not offer. BRF and PEF are designed to give a fixed page layout, suitable for a particular paper size ready for embossing (note both BRF and PEF offer the same.

When it comes to braille music, I think we mentioned at the meeting that if you need to change the paper size, then you really need to retranslate the braille music, because the layout is too drastically affected.

Hope I'm making sense...

With best regards,
James.